Ninabuck Road Bridge
Spanning Crawfish River on Ninabuck Road
Danville Vicinity
Dodge County
Wisconsin

HAER No. WI-93

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Great Lakes System Office
1709 Jackson Street
Omaha, Nebraska 68102-2571

HAER NO. WI-93

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HISTORIC AMERICAN ENGINEERING RECORD

NINABUCK ROAD BRIDGE

Location: Ninabuck Road over the Crawfish River
Danville Vicinity, Dodge County, Wisconsin

USGS Astico Quadrangle, Universal Transverse Mercator Coordinates: Zone 16 Easting 340420 Northing 4798160

Present Owner: Town of Elba

Present Use: Vehicular bridge

Significance: The Ninabuck Road Bridge is a single span, single lane, Pratt through truss that was erected in ca. 1907. Although it was not identified as a significant structure in *Cultural Resource Management in Wisconsin* (the state's cultural resource management plan), the crossing is one of thirty-three, pre-1912 bridges identified by the state's Historic Bridge Advisory Committee during the early 1980s.[1] Fewer than twenty of these bridges remain today. Therefore, with its integrity generally intact, the Ninabuck Road Bridge is significant as a good and increasingly rare example of a late nineteenth/early twentieth century Pratt through truss in Wisconsin, as well as the only extant example of its kind in Dodge County.

PART I. HISTORICAL INFORMATION

A. Physical History:

1. Date of erection: ca. 1907[2]

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[1]Barbara Wyatt, ed., *Cultural Resource Management in Wisconsin*, Vol. 2 (Madison: State Historical Society of Wisconsin, Historic Preservation Division, 1986), Transportation, 12/14.

[2]The specific date of construction for the Ninabuck Road Bridge is unknown. Research has revealed that the Dodge County Board of Supervisors approved a contract for a bridge across the Crawfish River in the Town of Elba in 1906-1907, the same period in which C.F. Ninabuck was the town chairman. Based on this set of circumstances, in addition to the fact that Ninabuck Road was adjacent to C.F. Ninabuck's property, it has been suggested "that he [Ninabuck] proposed the bridge's construction [while he was chairman] in part to serve his own interests." There is a problem with this conclusion, however. At least three bridges crossed the Crawfish River in the Town of Elba in the early twentieth century, and it is uncertain if the subject bridge was the one to which the 1906-1907 reference was made. Efforts were made to locate specific references to the Ninabuck Road Bridge in the Columbus, Wisconsin, newspaper, as well as by contacting the Town of Elba Clerk--Faye Pergande. The newspaper research revealed nothing helpful, nor did the

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2. Architect: Unknown

3. Original and subsequent owners: Public ownership.

4. Builder: Unknown

5. Alterations and additions: The historical integrity of this structure is generally good, although no bridge plates are extant, and the deck railing may not be original.

B. Historical Context:

DODGE COUNTY & LOCAL AREA HISTORY

Settlement in Dodge County began in 1836, when Jacob P. Brower, John Cole, Amasa Hyland and Luther A. Cole arrived in the area.[3] Brower's was the first family to settle in Dodge County, and that was at Fox Lake, in the county's northwest corner. Settlement in the east half of the county did not really begin until 1844 and 1845, when Horicon and Mayville were established. The county itself was organized in 1840.[4]

Although iron ore was discovered and mined in the Mayville/Iron Ridge area, agriculture was the primary focus of most individuals who came to the county. Indeed, over fifty percent of the county's land was devoted to agriculture by 1860. The area's agricultural development continued. By 1870, Dodge County had 4,913

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conversation with Pergande. She indicated that the town records are presently in the back of a closet in the old town hall. A new town hall was recently built, and she hopes to sort through the material once it has been moved. In the meantime, she has seen material that only dates to the 1940s or 1950s and does not think there is much, if anything, that is older. Consequently, given the information revealed in the 1906-1907 supervisors' action, the case that nothing else could be learned about the Ninabuck Road Bridge specifically, as well as the fact that the characteristics of the bridge are certainly consistent with a 1895-1910 period of construction (i.e. "light and slender" components, pinned connections, built-up compression elements, etc.), a circa date of 1907 has been assigned for the bridge's construction. Another review of the Dodge County Supervisors' records revealed that a bridge in the Town of Elba had been repaired in 1913--but again, there is no reference to which bridge. Local Columbus newspaper, various dates reviewed; *Official Proceedings of the Board of Supervisors of Dodge County, WI, for the Year 1913*, available at the State Historical Society of Wisconsin, Madison, WI; Bridge Form E-B-56-69, State of Wisconsin DOT, Bridge P-14-89, Department of Transportation, Madison, WI; Richard A. Bernstein (SHSW) to Bob Newbery (WisDOT), memo, 14 January 1994, copy on file at Heritage Research, Ltd., Menomonee Falls, WI; *Plat Book of Dodge County, Wisconsin* (Des Moines, IA: Northwest Publishing Co., 1910); Faye Pergande, telephone conversation with John Vogel, 18 October 1993.

[3]*History of Dodge County, Wisconsin* (Chicago: Western Historical Company, 1880), 321.

[4]Ibid., 321-23.

farms occupying 505,660 of the county's 563,545 acres.[5] The number of farms and acreage devoted to their operation stayed constant, with minor variations, well into the twentieth century.

Within this growing, agriculturally-oriented county, the Town of Elba was established.[6] Its early settlers, who were largely from the East, began arriving in 1843. Among them were members of the Miles Burnham family, one of whom built the first sawmill in the town in 1844. By 1870, Elba's population was 1,496. That same year, 5,670 acres of the town's land were planted in wheat, 1,433 acres were planted in corn and 1,249 acres were planted in oats.[7]

The Village of Danville evolved within the Town of Elba. The founding of Danville dates to 1844, when Miles and Morris Burnham and Samuel Hasey began to develop the water power at the site. Daniel E. Bassett laid out the village and opened a store in 1850. By 1860, the community had a Roman Catholic church, a Justice of the Peace, a doctor, a lawyer, two millers and two boot and shoe makers. Businesses in operation by 1878 included the Elba Flouring Mills, a carpentry shop and a stone masonry concern. But Danville never developed beyond a central place offering the first level of basic services to those in the surrounding countryside. Its 1880 businesses included a general store, a shoe shop, two blacksmiths and one wagon shop. It was observed that the village's "...growth has been limited, and after the lapse of thirty years, its population does not exceed what it was at that time."[8]

Danville's inability to grow was likely attributable to the fact that it was only about three miles from Columbus, a thriving trade center that offered railroad connections. The Crawfish River was between Danville and Columbus. The route that provided the most direct access between the two towns proceeded due west from Danville (along the exact alignment of today's Ninabuck Road), across the Crawfish River, and on to Columbus to the west northwest. This route, and the Crawfish River crossing, are clearly evident on a township map dated 1860. By 1890, the land on

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[5]*A Century of Wisconsin Agriculture, 1848-1948* (Madison: Wisconsin Crop & Livestock Reporting Service, 1948), 15, 87; *State of Wisconsin: 1985-1986 Blue Book* (Madison: State of Wisconsin, 1985), 711.

[6]Towns are an unincorporated unit of government into which counties are divided. They are also locally referred to as townships. Within towns or townships, villages and cities generally exist as separate, incorporated entities.

[7]*History of Dodge County*, 402-403; Homer Bishop Hubbell, *Dodge County Wisconsin: Past and Present*, Vol. 1 (Chicago: S.J. Clarke Publishing Company, 1913), 419-20.

[8]Hubbell, *Dodge County*, 421-22; *Map of Dodge County Wisconsin* (Chicago: S.H. Burhans and C.G. Scott, 1860); *History of Dodge County*, 570.

the south side of the road, immediately west of Danville, was owned by C.F. Ninabuck, after whom the road was presumably named. That land remained in the Ninabuck family into the 1930s. Although this route is the most direct route between Danville and Columbus, it should be noted that one could also travel north of Danville for one-half mile, turn west, and follow much the same route to Columbus as one who used the Ninabuck Road route. This north alternative was available to farmers by 1860, as was the Ninabuck Road/west route.[9]

The Ninabuck Road Bridge evolved within this general historical context to provide access across the Crawfish River.

TRUSS BRIDGES IN WISCONSIN

The two most commonly found types of truss bridges are the Pratt and Warren. These two classifications are further subdivided into pony or low trusses, overhead or through trusses and deck trusses. The Warren truss, which two British engineers patented in 1840, placed nominal stress on the vertical members, while the diagonals served as both tension and compression members. Caleb and Thomas Pratt patented the Pratt truss in 1844, incorporating vertical compression members and diagonal tension members. During the nineteenth century, the Pratt truss seemed to be more popular because it used less iron and was easier to erect. In the 1870s, numerous variations in the Pratt design were introduced for long span bridges. To save money and material, engineers "bent" the top chord into a polygonal configuration, thereby creating a Parker truss. If the top chord had exactly five sides, it was called a "camelback" truss. The increased live loads of railroad locomotives and rolling stock necessitated further design innovations. The addition of substruts and/or subties greatly fortified truss bridges and transformed a Pratt into a Baltimore and a Parker into a Pennsylvania truss--the latter considered a "major advance in strengthening the Pratt truss." Another development which sparked much debate around the turn-of-the-century involved the merits of pin connections versus riveted connections for main truss members. Proponents of riveted bridges cited the advantages of increased structural rigidity and the reduction of damaging vibrations; advocates of pin-connected bridges emphasized the theoretically correct stress distribution and the smaller amount of required metal. Although no dramatic resolution occurred, a compromise of sorts was reached in the early twentieth century. Riveted bridges were designed with less duplication of members, and pin-connected bridges, suitably

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[9] *Map of Dodge County*, (1860); *Plat Book of Dodge County, Wisconsin* (Minneapolis: C.M. Foote & Company, 1890); *Atlas of Dodge County, Wisconsin* (Rockford, IL: W.W. Hixson & Co., 1930[?]).

detailed, were still accepted for long span highway bridges.[10]

These developments affected Wisconsin bridge construction, but other circumstances were equally important. Until the latter nineteenth century, individual bridge companies were largely responsible for bridge design. Consequently, there was little, if any, standardization of design, although Pratt truss bridges seemed to predominate. Indeed, the state's oldest truss bridge, the 1877 White River Bridge in Burlington, is a Pratt. The Good Roads Movement of the late 1890s and early 1900s, however, prompted a dramatic shift regarding bridge design by promoting greater involvement on the part of local officials and, especially, the state government. In 1907, the state legislature established a Highway Division with the Wisconsin Geological and Natural History Survey to conduct experiments in road design and to provide professional advice to local governments about specific projects.[11]

The following year, Wisconsin voters overwhelmingly removed the greatest obstacle to creating a progressive statewide system of bridge and highway construction by eliminating the state's constitutional prohibition against direct state aid to transportation projects. In 1911, the legislature made its first appropriation for highway improvements. In addition, it transformed the Highway Division into an autonomous State Highway Commission (SHC), responsible for overseeing the expenditure of state funds for the development of a state highway network.[12]

The SHC emphasized the use of standardized plans for various types of bridges and culverts. Prior to this time, metal truss bridges dominated crossings of all lengths. After 1911, however, the SHC promoted the construction of girder, beam or slab spans of steel and/or concrete for short crossings (less than thirty-five feet). The SHC particularly favored concrete spans, citing the advantages of lower cost, greater compatibility with aesthetic treatment and greater adaptability to remodeling, especially in terms of roadway widening. Despite its predilection for concrete bridges, the SHC continued to design truss bridges for spans of thirty-six feet or more. The riveted Warren became the state's standard pony design. Indeed, this design became the state's most common type of highway truss bridge. Of the approximately 450 Warren trusses in the state in 1980, over four-fifths were riveted pony trusses built according to SHC standard plans. The SHC also drafted a standard

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[10]Jeffrey Hess, Robert M. Frame, III, Robert S. Newbery and John N. Vogel, "Bowen Mill Bridge," Historic American Engineering Record (HAER) Report, HAER No. WI-67 (1992): 3-5. On file at the Library of Congress, Washington, D.C.

[11]Ibid., 5-6.

[12]Ibid., 7.

plan for riveted, overhead Pratt trusses. In the first three and one-half years of its work, the SHC designed over fifteen hundred bridges of all types. Practically all the local bridges in the state during these years were either designed by the SHC or were based on SHC standard plans. The SHC continuously revised its truss designs, drawing upon the latest engineering information. In the 1930s, the SHC made a major commitment to keeping its standardized plans up to date by dropping the Pratt design in favor of the Warren for all overhead structures. Although concrete designs eventually dominated bridge construction, metal truss bridges remained cost effective in many situations. Consequently, the SHC continued to design truss bridges until well after World War II.[13]

The number of highway truss bridges in Wisconsin has dwindled substantially over the years. Under the sponsorship of the State Historic Preservation Office (SHPO) of the State Historical Society, George Danko initiated the first systematic study of Wisconsin truss bridges in 1976. By 1980, when WisDOT established the Historic Bridge Advisory Committee (HBAC), seventeen bridges had been listed or found eligible for listing on the National Register of Historic Places. The HBAC pursued the statewide inventory of truss bridges, which then accounted for approximately one-tenth of the state's 10,386 surviving highway bridges built before 1950.[14]

The HBAC identified an initial pool of 996 pre-1941 truss bridges that represented seventeen structural types. The HBAC screened this pool to identify the following for each truss type: those bridges which had the earliest known construction dates; those in the best condition; bridges with the best available historical data; and those with the most noteworthy features. Including bridges in park settings, this winnowing process reduced the initial pool to 247. The most significant bridges within each truss category were determined by applying criteria--modified as necessary--that were developed in a Virginia study. The evaluation process yielded a final group of fifty-three bridges deemed potentially eligible for the National Register. Historians Jeffrey A. Hess and Robert M. Frame, III, contracted to complete a field survey and compile historical data for those bridges in 1986. The final survey totaled fifty-four bridges, including two already listed on the National Register.[15]

THE NINABUCK ROAD BRIDGE

The exact history of the Ninabuck Road crossing, and the bridges associated with it,

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[13]Ibid., 7-8.

[14]Ibid., 8-9.

[15]Ibid., 9-10. Those listed in the National Register were structures P-18-720 and P-53-162.

is very vague.[16] That fact notwithstanding, it appears that the earliest bridge was built prior to 1860. Why a structure was built on Ninabuck Road is unclear, since there appears to be nothing unique about the crossing in the context of a main travel route. Indeed, an east/west road to Columbus that passed straight through the Town of Elba was located only one-half mile to the north.[17] Consequently, it is likely that the Ninabuck Road crossing simply evolved as one of convenience for the farmers that traveled between Danville and Columbus, and throughout the southwest region of Dodge County, in general. As such, the crossing was built to help serve and maintain a significant, county-wide industry.

PART II. ARCHITECTURAL INFORMATION

A. General Statement:

1. Architectural character: The Ninabuck Road Bridge was built in ca. 1907. It is an eight-panel, Pratt through truss bridge.

2. Condition of fabric: The historic fabric of this structure is generally good.

B. Description:

The length of the Ninabuck Road Bridge is 123 feet 6.5 inches, while the length of the overall structure, including approaches, is 154 feet 6.5 inches. Its single lane traffic deck is 16 feet 1 inch wide. Anchored to four concrete-filled, steel cylinders, the traffic deck is carried by nine floor beams, the outer two of which are 4.5 inch by 10 inch built up "I" beams that are fabricated from angles and plates. They rest upon the cylinders. Intermediate beams two through eight are also built up "I" beams, although they are 6.25 inches by 22 inches. Perpendicular to the floor beams are nine deck stringers. The two outer stringers are 8 inch channels, while those in between are 8 inch by 4 inch "I" beams. The bottom lateral bracing is comprised of 1.25 inch rods that are threaded and bolted. The deck itself is a metal grate.

Floor beams two and eight are hung from hip verticals of paired, .87 inch square bars, and beams three through seven are hung from double channel intermediate verticals with lacing front and back and varying dimensions. Verticals three and seven are 6 inches by 8.75 inches, while verticals four and six are 5 inches by 8.5 inches; vertical

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[16]See footnote #2 for a discussion of the efforts made to locate information about the bridge.

[17]*Map of Dodge County* (1860).

five is 4 inches by 8.5 inches. The inclined endposts and the top chords are 8 inches by 12 inches and fabricated from 8 inch channels, coverplates and lacing. The top lateral bracing consists of .87 inch rods, while the top struts are comprised of 2 inch angles, back-to-back with cross-lacing. Portal struts are fabricated from 2.5 inch angles, back-to-back with cross-lacing of 1.5 inch by .25 inch flat iron. The portal bracing utilizes 2 ½ inch by 1.75 inch angles, back-to-back, with the same cross-lacing utilized in the portal struts.

The dimensions of the diagonal members vary with each panel. Those in panels two and seven consist of paired, 2.5 inch by .75 inch bars, while those in panels three and six are paired, 2 inch by .68 inch bars with a single .75 inch rod that crosses them. Diagonals in panels four and five are of paired, 1.5 inch by .43 inch bars, as well as paired, .62 inch rods. Bottom chords are paired, rectangular eyebars that also vary with each panel. Those in panels one, two, seven and eight are 2.5 inch by .62 inch bars, while those in panels three and six are 3 inch by .87 inch bars; those in panels four and five are 3.5 inch by .93 inch bars.

All major joint connections are pinned.

The bridge has no ornamentation. It does, nevertheless, have a three course railing on each side of the traffic deck that is comprised of 1.62 inch pipes.

C. Setting:

The bridge is located in the Town of Elba, in the vicinity of Danville, at that point where Ninabuck Road crosses the Crawfish River. Oriented on an east/west axis, the bridge exists in a completely rural setting. Trees grow along the river bank while tall, un-cut grass and brush are prominent throughout the area. Although nothing is cultivated near the bridge, several farms are located along Ninabuck Road

PART III. SOURCES OF INFORMATION

A. Bibliography:

1. Primary or unpublished sources:

Atlas of Dodge County, Wisconsin. Rockford: W.W. Hixson & Co., 1930(?).

Bernstein, Richard A. Memo to Bob Newbery (WisDOT), 14 January 1994. Copy in possession of Heritage Research, Ltd., Menomonee Falls, WI.

Local Columbus newspaper. Various dates.

Map of Dodge County Wisconsin. Chicago: S.H. Burhans and C.G. Scott, 1860.

Official Proceedings of the Board of Supervisors of Dodge County, WI, for the Year 1913. Available at the State Historical Society of Wisconsin, Madison, WI.

Pergande, Fay. Telephone conversation with John Vogel. 18 October 1993.

Plat Book of Dodge County, Wisconsin. Minneapolis: C.M. Foote & Company, 1890.

Plat Book of Dodge County, Wisconsin. Des Moines, IA: Northwest Publishing Co., 1910.

2. Secondary and published sources:

Bridge Form E-B-56-69. State of Wisconsin DOT. Bridge P-14-89. Department of Transportation, Madison, WI.

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Hubbell, Homer Bishop. *Dodge County Wisconsin: Past and Present.* Vol. 1. Chicago: S.J. Clark Publishing Company, 1913.

State of Wisconsin: 1985-1986 Blue Book. Madison: State of Wisconsin, 1985.

Wyatt, Barbara, ed. *Cultural Resource Management in Wisconsin.* Vol. 2. Madison: State Historical Society of Wisconsin, Historic Preservation Division, 1986.

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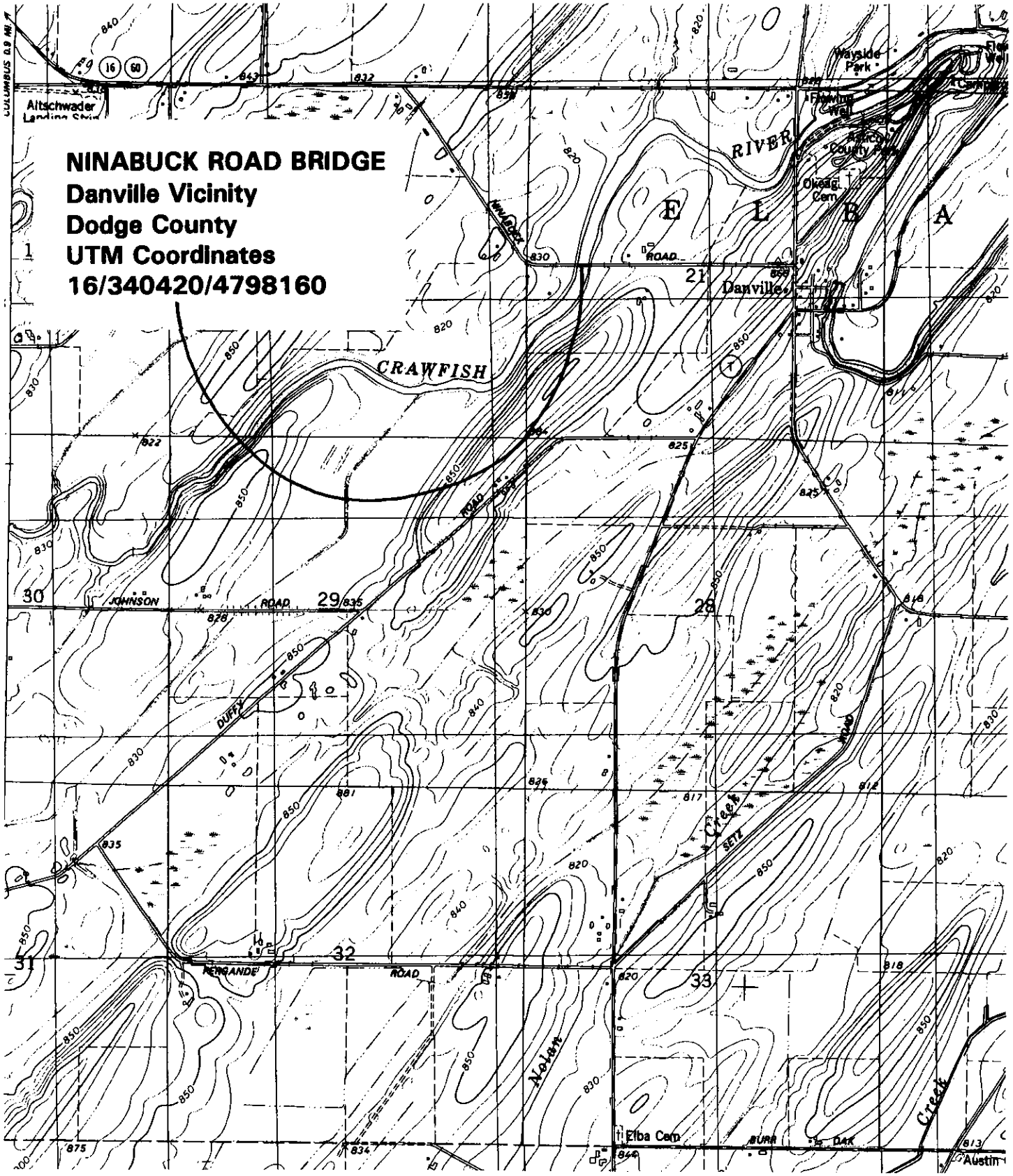
1 July 1996

PART IV. PROJECT INFORMATION

This project has been sponsored by the Wisconsin Department of Transportation. Ayres Associates, consulting engineers in Madison, Wisconsin, formally acted as the contracting agency. The project was directed by Dr. John N. Vogel, Principal Investigator and Sr. Historian for Heritage Research, Ltd. (HRL), who provided the photographic documentation and the architectural/technical data. He also edited and prepared the final document. The general truss bridge context was originally prepared by Jeffrey Hess, Robert Frame, III, and Robert Newbery in a report for the Wisconsin Department of Transportation. That context was edited and summarized by Dr. Kevin Abing, who also prepared the local contextual information.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UTM Coordinates
16/340420/4798160
Altschwader
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Flowing Well
RIVER
Okeag. Cem
Danville
CRAWFISH
JOHNSON
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DUFFY
ROAD
SETZ
Creek
HERGANDE
ROAD
Nolan
Creek
Elba Cem
BURR
OAK
Austin